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TARGET : STAGE – I

QUESTIONS BANK

**HOMI BHABHA
Young Scientist Exam**

PHYSICS

CLASS : IX

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STUDY SMARTER NOT HARDER

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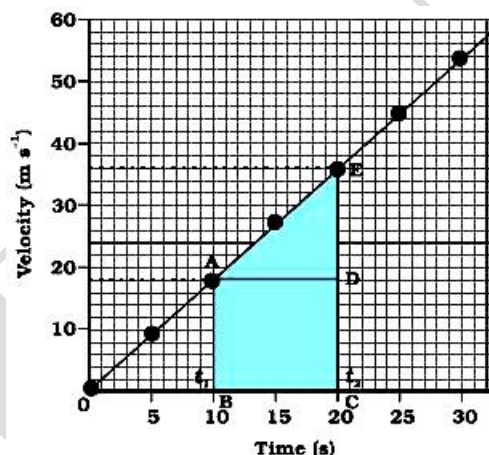
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1. MOTION & TYPES OF MOTION

- Rate of change of displacement is called
 - Speed
 - Velocity
 - acceleration
 - deceleration
- Acceleration is a vector quantity, which indicates that its value
 - Can be positive, negative or zero
 - Is always negative
 - Is always positive
 - Is zero
- A man travels a distance of 20 km from his home to office, and 10 km towards his house back. Then the displacement covered by the man in the whole trip is
 - 30 km
 - zero km
 - 10 km
 - 50 km
- A farmer moves along the boundary of a square field of side 10 m in 40 sec. The magnitude of displacement of the farmer at the end of 2 minutes 20 seconds from his initial position is
 - 10m
 - 30m
 - 40m
 - $10\sqrt{2}$ m
- An object travels 20m in 5 sec and then another 40m in 5 sec. What is the average speed of the object?
 - 12m/s
 - 6m/s
 - 2m/s
 - 30 m/s
- Formula to find the average velocity of a body with constant acceleration is given by
 - $V = u + at$
 - $S_n = \{u + a/2(2n-1)\}$
 - $S = ut + \frac{1}{2}at^2$
 - $V_{av} = (u + v)/2$
- SI Unit of measurement of acceleration is
 - m/s
 - m/hr
 - m/s^2
 - M
- An example of a body moving with constant speed but still accelerating is
 - A body moving with constant speed in a circular path
 - A body moving in a helical path with constant speed
 - A body moving with constant speed on a straight road
 - A body moving with constant speed on a straight railway track
- The acceleration of a body from a velocity -time graph is
 - Equal to the slope of the graph
 - Area under the graph
 - Is denoted by a line parallel to the time axis at any point on the distance axis
 - Is denoted by a line parallel to the distance axis at any point on the time axis

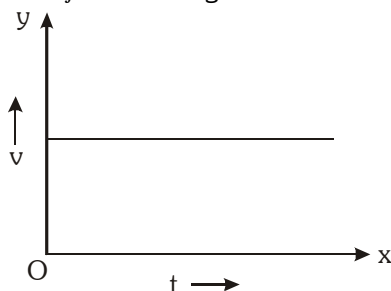
- Displacement covered by a body from velocity-time graph is
 - Area under the graph
 - Is denoted by a line parallel to the time axis at any point on the distance axis
 - Equal to the slope of the graph
 - Is denoted by a line parallel to the distance axis at any point on the time axis

Answer the following from the below graph
(Q.11-Q.15):

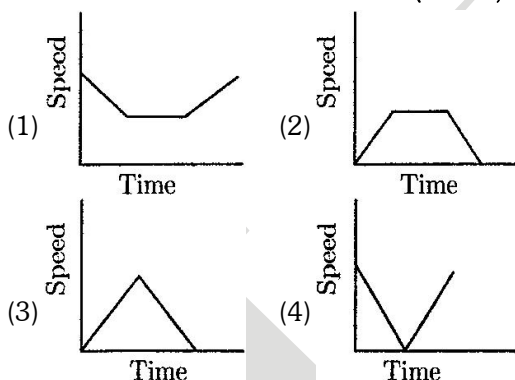


- From the figure the body is moving with
 - Variable Acceleration
 - Constant Acceleration
 - Zero Acceleration
 - Zero velocity
- Distance covered by the body during the interval from 10 sec to 20 sec is -
 - 200m
 - 360m
 - 270m
 - 400m
- At the point A the body is at a distance of
 - 180m
 - 300m
 - 200m
 - 50m
- The velocity of the body at the point 'B' is
 - 40m/s
 - 36m/s
 - 50m/s
 - 20m/s
- In the total journey the body has travelled up to a distance of
 - 1000 m
 - 800 m
 - 990 m
 - 270 m
- What does the slope of distance - time graph give?
 - Speed
 - Acceleration
 - Uniform speed
 - Both 1 and 3 depending upon the time of graph

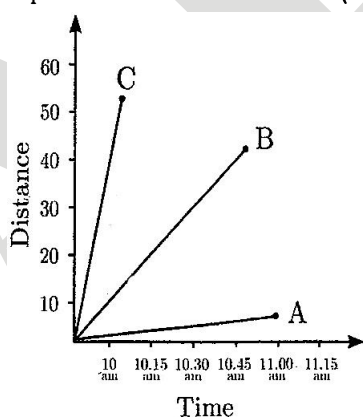
17. From the given v-t graph (figure) it can be inferred that the object is moving with



- (1) uniform velocity
(2) at rest
(3) non uniform velocity
(4) moving with uniform acceleration
18. The equation related to momentum of a system is $m_2(v_2 - u_2) \neq -m_1(v_1 - u_1)$ where symbols have usual meaning. This may be because of _____.
(1) m_1 is much bigger than m_2 (HBBV, 2014)
(2) some external forces are acting
(3) momentum is neither created nor destroyed
(1) direction of u_1 and u_2 are not opposite.
19. Which of the following speed – time graphs will represent the case of : "A cricket ball thrown vertically upwards and returning to the hands of the thrower". (HBBV, 2014)



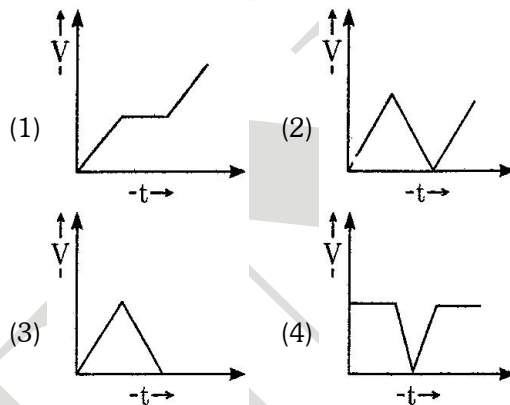
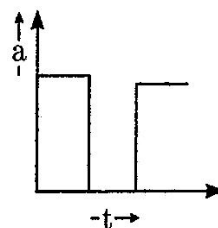
20. Time Distance graph of 3 methods of transport A, B and C is plotted. (HBBV, 2014)



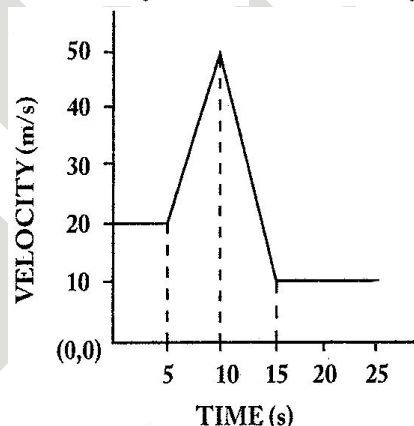
Select the correct option for A, B and C?

- (1) A : Car, B : Bullock – Cart, C : Ant
(2) A : Person walking, B : Car, C : Aircraft
(3) A : Bullock – Cart, B : Tortoise, C : Person walking
(4) A: Ant, B : Aircraft, C : Car

21. Acceleration — time graph of a body 'is shown. The corresponding velocity — time graph of the same body will be _____? (HBBV, 2014)



- 22.

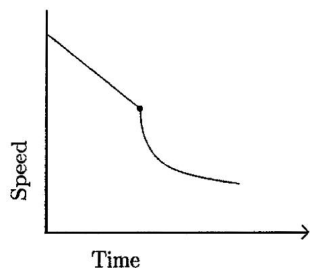


Study the velocity – time graph (HBBV, 2013)

Choose the incorrect statement from the following.

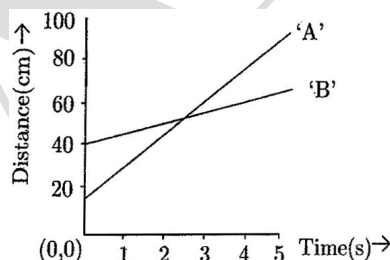
- (1) After 5 sec, body increases its velocity
(2) Between 10 s and 15 s, body has negative acceleration
(3) In first 5 sec, body travels 100 meter
(4) After 15 sec, body comes to rest
23. A stone tied with string is in uniform circular motion at 5 rotations/minute. Choose the incorrect statement. (HBBV, 2013)
- (1) It has uniform velocity
(2) It takes 12 sec to complete one rotation
(3) Its speed depends on the length of the string
(4) It will be thrown tangentially if cut off from the string
24. A car travels 30 km at uniform speed of 40 km/h and next 50 km at uniform speed of 20 km/h. What will be the average speed of car? (HBBV, 2013)
- (1) 20 km/h (2) 30 km/h
(3) 24.6 km/h (4) 32.3 km/h

25. A passenger in a moving train tosses a coin which falls behind him. What can you say about the motion of train? (HBBV, 2012)
 (1) Uniform (2) Retarded
 (3) Accelerated (4) At rest
26. Ancient Indian astronomer had defined _____ constellations. (HBBV, 2012)
 (1) 29 (2) 27
 (3) 88 (4) 86
27. The graph represents which type of motion ?



- (1) Retarding (HBBV, 2012)
 (2) Non-uniformly retarding followed by uniform retardation.
 (3) Non-uniformly retarding.
 (4) Uniformly retarding followed by non uniform retardation
28. A car is travelling 20 m/s along a road. A child runs out on the road 50 m ahead and the car driver steps on brake pedal. What must be car's deceleration if the car is to stop just near the child? (HBBV, 2012)
 (1) 4 m/s^2 (2) 2.5 m/s^2
 (3) 1 m/s^2 (4) 0.2 m/s^2
29. When a car of mass 1,800 kg moving with a speed of 10 m/s is brought to rest, covers a distance of 50 m and stops. What will be the force acting on the car ? (HBBV, 2011)
 (1) 180 N (2) -180 N
 (3) 1,800 N (4) -1,800 N

30. Observe the graph for object A and object B and select the correct option: (HBBV, 2011)

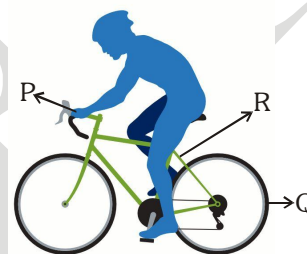


- (1) Graph for two objects having unequal velocities.
 (2) Graph for two objects having equal velocities.
 (3) Graph for two objects having equal velocities in opposite direction
 (4) Graph for two objects having unequal velocities in opposite direction

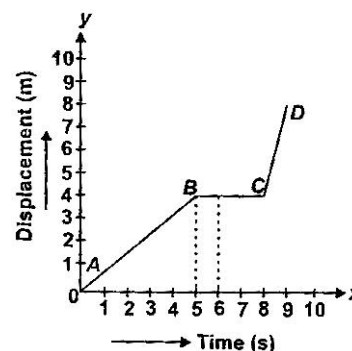
31. A stone is dropped in the water. It strikes the surface of the water after 2 sec. Calculate the distance covered by the stone in air as well as the velocity at which it strikes the water. ($g = 9.8 \text{ m/s}^2$)
 (1) 19.6 m and 19.6 m/s respectively (HBBV, 2011)
 (2) 1.96 m and 19.6 m/s respectively
 (3) 19.6 m and 1.96 m/s respectively
 (4) 1.96 m and 1.96 m/s respectively
32. A person standing in a valley between two hills fired a gun and heard first echo after 0.5 sec. If the second echo is heard after 0.9 sec., what will be the distance between two hills? (HBBV, 2011)
 (1) 288 m (2) 238 m (3) 248 m (4) 245 m

Application Based Questions

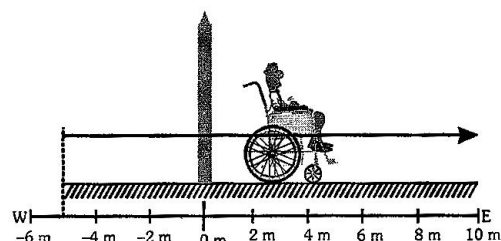
33. Which part of the moving cycle shown in the figure undergoes rotatory motion?



- (1) P (2) Q
 (3) R (4) All of these
34. From the displacement-time graph shown here, find the velocity of the body as it move from C to D.

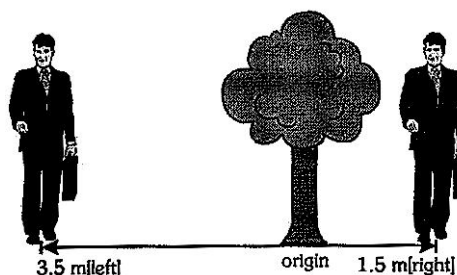


- (1) 2 ms^{-1} (2) 3 ms^{-1}
 (3) 4 ms^{-1} (4) 5 ms^{-1}
35. The final distance and displacement moved by a person sitting on a wheel chair from a position 5.0 m [W] to a position 10.0 m [E] is

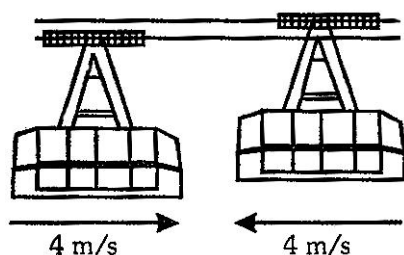


- (1) 10 m, +5 m (2) 15 m, +15 m
 (3) 15 m, -10 m (4) 15 m, -15

36. A traveller initially standing 1.5 m to the right of a tree moves so that he is 3.5 m to the left of the tree. The traveller's displacement is



- (1) + 2 m (2) - 2 m
(3) + 5 m (4) - 5 m
37. Two trolleys moving on parallel ropes are shown in figure. Which of the following statements is correct?

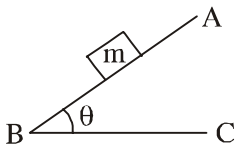


- (1) They have same velocity and same speed.
(2) They have different velocity and same speed.
(3) They have different velocity and different speed.
(4) They have same velocity and different speed.

ANSWER KEY

Q.	1	2	3	4	5	6	7	8	9	10
A.	2	1	3	4	4	1	3	1	1	1
Q.	11	12	13	14	15	16	17	18	19	20
A.	2	3	1	4	3	1	1	2	4	2
Q.	21	22	23	24	25	26	27	28	29	30
A.	1	4	2	3	3	2	4	1	4	1
Q.	31	32	33	34	35	36	37			
A.	1	2	2	3	2	4	2			

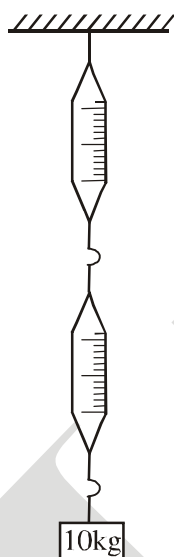
2. FORCE & NLM

- When a person is walking on ground
 - (1) He applies force on the ground
 - (2) The ground exerts a force on him
 - (3) No force is applied by the person
 - (4) Both (1) and (2)
- A block of mass 'm' placed on an inclined plane slides with uniform acceleration, then
 
 - (1) The sum of the forces acting downward along the plane are equal to the sum of the forces acting upwards along the plane
 - (2) The weight of the body acts perpendicular to the inclined plane AB
 - (3) The normal reaction of the block is acting perpendicular to the horizontal plane (BC)
 - (4) The component of weight $mg \cos \theta$ acts perpendicular to the inclined plane
- When a branch of a tree is shaken, the ripe fruits get detached from the branch. This is an example of
 - (1) Newton's first law of motion
 - (2) Newton's second law of motion
 - (3) Newton's third law of motion
 - (4) All the above
- The mass of a body is 20 kg. This weight is equal to
 - (1) 1960 N
 - (2) 196 J
 - (3) 196×10^5 dyne
 - (4) 19.6 N
- Two bodies A and B, moving in the same direction collide and after collision, move with the common velocity in the direction of A.
 - (1) The magnitude of force exerted by A on B is greater than the magnitude of force exerted by B on A
 - (2) Both of them exert an equal but opposite force on each other
 - (3) The change in momentum of A and B are equal but opposite in direction
 - (4) Both (2) and (3)
- Action and reaction
 - (1) always exist in pairs
 - (2) are equal in magnitude
 - (3) always act in opposite direction
 - (4) All the above are true
- The statement 'Friction is a self adjusting force' is
 - (1) a false statement
 - (2) true in the case of static friction
 - (3) true in the case of rolling friction
 - (4) true in the case of sliding friction

- If the momentum of a moving bus, whose mass is doubled, then its kinetic energy becomes
 - (1) Double
 - (2) Triple
 - (3) Quadruple
 - (4) Remains constant
- Identify the vector quantity from the given following -
 - (1) Impulsive force
 - (2) Weight
 - (3) Momentum
 - (4) All the above
- The momentum 'P' and the kinetic energy 'E' of a body of mass 'm' are related as
 - (1) $P = \sqrt{2mE}$
 - (2) $P = \frac{1}{2} mE$
 - (3) $P = \frac{2m}{E}$
 - (4) $P = 2mE$
- The rate of change in momentum of a body is
 - (1) Equal to the force applied on it
 - (2) Proportional to the force applied on it
 - (3) In the direction of applied force
 - (4) All the above are true
- The bodies of equal masses have kinetic energy in the ratio of 4 : 9. The ratio of their velocity is
 - (1) 3 : 2
 - (2) 4 : 9
 - (3) 2 : 3
 - (4) 9 : 4
- A coconut is of mass 1 kg. Find its weight (Take $g = 9.8 \text{ m/sec}^2$)
 - (1) 1 N
 - (2) 9.8 N
 - (3) 1 Kg Wt
 - (4) Both (2) & (3)
- A body of mass 5 kg is acted upon by a force. Its velocity changes to 5 m/sec. Find its initial and final momentum.
 - (1) 0 & 25 Kg m/sec
 - (2) 25 Kg m/sec & 0
 - (3) 25 Kg m/sec & 25 Kg m/sec
 - (4) None
- While opening a tap with two fingers, the forces applied are
 - (1) Equal in magnitude
 - (2) Parallel to each other
 - (3) Opposite in direction
 - (4) All the above
- A force acts on an object while in the state of motion. If the force acting on it is equal to sum of all the opposing forces, then the object
 - (1) Stops after covering some distance
 - (2) Moves with uniform acceleration
 - (3) Moves with uniform velocity
 - (4) Moves with uniform retardation

- 17.** Which of the following laws of motion is (are) involved in the motion of rocket ?
(1) Newton's first law of motion
(2) Newton's second law of motion
(3) Newton's third law of motion
(4) All the above
- 18.** Slope of a velocity-time graph gives
(1) The distance (2) The displacement
(3) The acceleration (4) The speed
- 19.** Which of these is not an effect of force ?
(1) It can start a stationary object
(2) It can change the colour of an object
(3) It can increase the speed of a moving body
(4) It can stop a moving body
- 20.** Acceleration is always in the direction
(1) of the displacement
(2) of the initial velocity
(3) of the final velocity
(4) of the net force
- 21.** A body P has mass $2m$ and velocity $5V$. Another body Q has mass $8m$ and velocity $1.25V$. The ratio of momentum of P and Q is
(1) $2 : 1$ (2) $1 : 1$
(3) $1 : 2$ (4) $3 : 2$
- 22.** The term 'mass' refers to the same physical concept as
(1) Weight (2) Inertia
(3) Force (4) Acceleration
- 23.** Which of the following situations involves a non contact force ?
(1) Opening a drawer
(2) Kicking a ball
(3) Magnet pulling an iron piece
(4) Closing a door
- 24.** The linear momentum of a body can be changed by
(1) Any force (2) A net external force
(3) An internal force (4) Both (2) & (3)
- 25.** If the action force acting on a body is gravitational in nature, then the reaction force
(1) may be constant force
(2) must be gravitational too
(3) may be a gravitational or contact force
(4) must be a force of any origin
- 26.** An automobile that is towing a trailer is accelerate on a level road. The force that the automobile exerts on the trailer is
(1) Equal to the force the trailer exerts on the automobile
(2) Greater than the force the trailer exerts on the automobile
(3) Equal to the force the trailer exerts on the road
(4) Equal to the force the road exerts on the trailer
- 27.** The athlete runs some distance before taking a long jump to
(1) Acquire larger inertia of motion
(2) Overcome inertia of rest
(3) Get inertia of direction
(4) Acquire maximum energy
- 28.** The direction of linear momentum is
(1) In the direction of line
(2) In direction of velocity
(3) In the direction of change of velocity
(4) In the direction of acceleration of the body
- 29.** How much acceleration will be produced in a body of mass 10 kg acted upon by a force of 2 kgf [$g = 9.8\text{ m/sec}^2$]
(1) 4.96 m/sec^2
(2) 3.96 m/sec^2
(3) 2.96 m/sec^2
(4) 1.96 m/sec^2
- 30.** Regarding linear momentum of a body -
(a) It is measure of quantity of motion contained by the body.
(b) Change in momentum is measure of impulse
(c) Impulse and acceleration act in opposite direction to the change in momentum
(d) In the case of uniform circular motion the linear momentum is conserved
(1) a & b are true
(2) b & c are true
(3) c & d are true
(4) a, b & c are true
- 31.** In case of a book lying on a table, then which of the following is correct
(1) Action of book on the table and reaction of table on book are equal and opposite and are inclined to vertical
(2) Action and reaction are equal and opposite and act perpendicular to the surfaces of contact
(3) Action and reaction are equal but act in the same direction
(4) Action and reaction are most equal but are in opposite direction
- 32.** The change in momentum per unit time of a body represents
(1) Impulse
(2) Force
(3) Kinetic energy
(4) Resultant force

33. A force ' F_1 ' is acting on a 4 kg body produced an acceleration of 5 m/sec^2 another force ' F_2 ' acting on a 10 kg body produces an acceleration of 5 m/sec^2 then F_1 & F_2 respectively are
 (1) 20 N, 50 N (2) 40 N, 20 N
 (3) 4 N, 10 N (4) 10 N, 4 N
34. A particle is in straight line motion with uniform velocity. A force is not required.
 (1) To increase the speed
 (2) To decrease the speed
 (3) To keep the speed same
 (4) To change the direction
35. When a body is stationary
 (1) There is no force acting on it
 (2) The forces acting on it are not in contact with it
 (3) The combination of forces acting on it balanced
 (4) The body is in vacuum
36. A block of mass 10 kg is suspended through two light spring balance as shown in figure



- (1) Both the scales will read 5 kg
 (2) Both the scales will read 10 kg
 (3) The lower scale will only read 10 kg
 (4) The readings may be anything but their sum will be 10 kg

37. The dust on a carpet can be removed by giving a sudden jerk with a stick because
 (1) Inertia of rest keeps the dust in its position
 (2) Inertia of motion removes dust
 (3) Dust particles are very light
 (4) Jerk compensates for the force of adhesion between dust and carpet
38. A car of mass 200 kg is moving with a speed of 20 m/sec after 25 seconds the velocity increased by 10 m/sec, then what is the change in momentum ?
 (1) 4000 kg m/sec (2) 3000 kg m/sec
 (3) 1000 kg m/sec (4) 2000 kg m/sec
39. An object is thrown vertically upward with a non-zero velocity. If gravity is turned off at the instant the object reaches the maximum height, what happens
 (1) The object continues to move in straight line
 (2) the object will be at rest
 (3) the object falls back with uniform velocity
 (4) the object falls back with uniform acceleration
40. A 4 kg object is moving across a friction less surface with a constant velocity of 2 m/sec. The force necessary to maintain this state of motion is
 (1) 0 N (2) 8 N
 (3) 4 N (4) 2 N

ANSWER KEY

Q.	1	2	3	4	5	6	7	8	9	10
A.	4	4	1	3	4	4	2	3	4	1
Q.	11	12	13	14	15	16	17	18	19	20
A.	4	3	4	1	4	3	3	3	2	4
Q.	21	22	23	24	25	26	27	28	29	30
A.	2	2	3	2	2	1	1	3	4	1
Q.	31	32	33	34	35	36	37	38	39	40
A.	2	4	1	3	3	2	1	4	2	1

3. THRUST & PRESSURE

1. Which of the following physical quantities is useful to determine the purity of an element
(HBBVS 2016)
(1) Mass (2) volume
(3) density (4) weight
2. The construction of submarine is based on
(1) law of gravitation (HBBVS 2016)
(2) law of inertia
(3) Pascal's law
(4) Archimedes principle
3. $5\text{ cm} \times 2\text{ cm} \times 3\text{ cm}$ are the dimensions of a cuboidal block and its mass is 50 gm the density of liquid in which it floats must of
(1) 1.5 gm/cm^3 (2) 1.75 gm/cm^3
(3) 1.3 gm/cm^3 (4) 0.6 gm/cm^3
4. A ship made up of iron sheet is able to float on water but iron sheet sinks in water which of the following quality of iron changes when sheet takes the shape of a ship
(1) Mass (2) Density
(3) Relative density (4) Upthrust
5. A piston applies a force of 36 N on square area having length 12 cm. Final pressure acting on plate
(1) 35 Pa (2) 250 Pa
(3) 2500 Pa (4) 25000 Pa
6. A uniform object of density 0.6 gm/cm^3 is floating in a liquid of density 0.8 gm/cm^3 to what level will the object sink
(1) 50 % of it's volume
(2) 75 % of it's volume
(3) 80 % of it's volume
(4) 90 % of it's volume
7. Unit of Relative density is
(1) Kg/m^3
(2) Unit less
(3) Depend on material
(4) Kg/m^2
8. Pressure at a point in the liquid is
(1) Same in all direction
(2) Greater in upward direction
(3) Greater in downward direction
(4) Can't say
9. If weight of an object is equal or less than upthrust acting on it then object would
(1) Balance (2) Equal
(3) Float (4) Sink
10. If weight of an object is greater than upthrust acting on it then object would
(1) Balance (2) Equal
(3) Float (4) Sink
11. Height of atmosphere, if atmospheric density is 1.29 Kg m^{-3} and atmospheric pressure is 101 KPa is
(1) 7839.4 m (2) 7829.4 m
(3) 2849.4 m (4) 7859.4 m
12. As depth increases, pressure in a fluid
(1) Increases (2) Decreases
(3) Remain Const. (4) Varies
13. A stone weighs 450 N in air and 200 N in water compute the volume of stone
(1) $.025\text{ m}^3$ (2) $.05\text{ m}^3$
(3) 0.75 m^3 (4) Can't say
14. A stone weighs 650 N in air and 275 N in water compute it's specific gravity
(1) 1.73 (2) 2.45
(3) 3.45 (4) 0.865
15. A wooden cube of sides 10 cm each dipped in water upthrust of water would be
(1) 20 N (2) 12 N
(3) 10 N (4) 15 N
16. Density of metal spoon when its weight in air is 0.48 N and in water is 0.42 N is
(1) 1000 Kg m^{-3} (2) 4000 Kg m^{-3}
(3) 6000 Kg m^{-3} (4) 8000 Kg m^{-3}
17. The ratio of height of mercury column in barometer at a place to the height of the liquid column at same place are 1 : 4. Find density of liquid -
(1) 3.4 gm/cm^3 (2) 2.4 gm/cm^3
(3) 2.1 gm/cm^3 (4) 4.1 gm/cm^3
18. As we move upwards the atmospheric pressure -
(1) Increases (2) Decreases
(3) Remain same (4) Can't say
19. A body weighs 40 g in air. If it's volume is 10 cc, in water it will weighs
(1) 30 g (2) 40 g
(3) 50 g (4) Can't say
20. Calculate the pressure at the bottom of a tank due to water column of height 200 m ($g = 10\text{ ms}^{-2}$)
(1) 10^6 Pa (2) $5 \times 10^6\text{ Pa}$
(3) $2 \times 10^6\text{ Pa}$ (4) 10 Pa
21. A liquid column of vertical height 1.2 m exerts a pressure 19992 Pa at it's bottom. Find density of liquid ($g = 9.8\text{ ms}^{-2}$)
(1) 1700 Kg m^{-3} (2) 200 Kg m^{-3}
(3) 1000 Kg m^{-3} (4) 9.8 Kg m^{-3}
22. Consider a force of 20 N acting normally on a surface whose area is 2 cm^2 , thrust acting who's on a unit area is _____ Nm^{-2} .
(1) 10^5 (2) 10
(3) 10^3 (4) 10^2

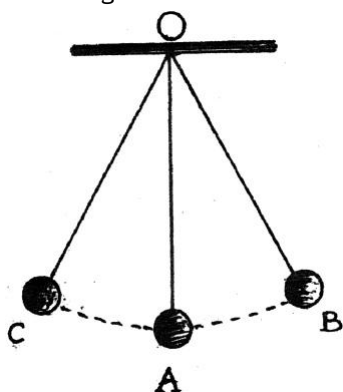
- 23.** In pressure cooker, the food is cooked faster, because the boiling point of water in cooker
(1) is above 100°C (2) is below 100°C
(3) is equal to 100°C (4) Can't say
- 24.** _____ suggested that the ships should be marked with load lines.
(1) Samuel Plimsoll (2) Einstein
(3) Newton (4) Archimedes
- 25.** Surface tension is explained on the basis of
(1) Molecular Theory
(2) Electron Theory
(3) Archimedes Principle
(4) Bernoulli Principle
- 26.** The R.D. of iron is 7.8 calculate it's density in S.I unit
(1) 7.8×10^3 (2) 78×10^3
(3) 0.78×10^3 (4) 7800
- 27.** If the centre of gravity of the body above the meta centre then body is said be in
(1) Stable equilibrium (2) Unstable equilibrium
(3) Neutral equilibrium (4) Both (2) & (3)
- 28.** 1 torr = _____.
(1) 1 cm of Hg (2) 1 mm of Hg
(3) 1 m of Hg (4) 76 cm of Hg
- 29.** One litre of water occupies a volume of
(1) 100 cm^3 (2) 250 cm^3
(3) 500 cm^3 (4) 1000 cm^3
- 30.** Density of water is maximum at -
(1) 0°C (2) 0 K
(3) 4°C (4) 100°C
- 31.** Manometer is used to measure
(1) Atmospheric pressure
(2) Pressure
(3) Depth
(4) Gravity
- 32.** A plastic ball moves from the bottom of container filled with water to top then
(1) It's velocity increases
(2) It's acceleration remain same
(3) It's velocity remain same
(4) Both (1) & (2)
- 33.** The density of copper is 8.83 g cm^{-3} . Express it in Kg m^{-3} .
(1) 8830 (2) 88.30
(3) 88300 (4) 8.8
- 34.** The atmospheric pressure at earth surface is P_1 and inside mine is P_2 . They are related as
(1) $P_1 = P_2$ (2) $P_1 > P_2$
(3) $P_1 < P_2$ (4) $P_2 = 0$
- 35.** The pressure P_1 at the tip of a dam and P_2 at a depth h from the top inside water are related as
(1) $P_1 > P_2$ (2) $P_1 = P_2$
(3) $P_1 - P_2 = h\rho g$ (4) $P_2 - P_1 = h\rho g$
- 36.** The pressure inside a liquid of density ρ at a depth h is
(1) $h\rho g$ (2) $\frac{h}{\rho g}$
(3) $\frac{h\rho}{g}$ (4) h
- 37.** A body will experience minimum upthrust when it is completely immersed in
(1) Turpentine (2) Water
(3) Glycerine (4) Mercury
- 38.** A body of density ρ sinks in a liquid of density ρ_2 . The densities ρ and ρ_2 are related as
(1) $\rho = \rho_2$ (2) $\rho < \rho_2$
(3) $\rho > \rho_2$ (4) Can't say
- 39.** A block of wood floats on water with $\frac{2}{5}$ th of its volume above the water surface. Calculate density of wood.
(1) 0.6 g cm^{-3} (2) 0.1 g cm^{-3}
(3) 2.2 g cm^{-3} (4) 4.2 g cm^{-3}
- 40.** For a floating body, its weight W and upthrust F_B on it case related as
(1) $W > F_B$ (2) $W < F_B$
(3) $W = F_B$ (4) Can't say

ANSWER KEY

Q.	1	2	3	4	5	6	7	8	9	10
A.	3	4	2	2	3	2	2	1	3	4
Q.	11	12	13	14	15	16	17	18	19	20
A.	2	1	1	1	3	4	1	2	1	3
Q.	21	22	23	24	25	26	27	28	29	30
A.	1	1	1	1	1	1	2	2	4	3
Q.	31	32	33	34	35	36	37	38	39	40
A.	2	1	1	3	4	1	1	3	1	3

4. WORK, POWER & ENERGY

- Work done by a body from Force-distance curve is
 - Slope of the curve
 - Line parallel to the distance axis
 - Area under the curve
 - Line parallel to the Force axis
- What will be the power of an engine from the following, if it is working with the rate 60 Joule/min?
 - 60 watt
 - 10 watt
 - 0.1 watt
 - 1 watt
- In the adjoining diagram the pendulum is in motion. What type of an energy of pendulum at point 'A' shown in the diagram?



- Only kinetic energy
 - Only potential energy
 - Both, kinetic and potential energy
 - Zero energy
- When a body rolls down an inclined plane, then it has
 - Only Kinetic energy
 - Both kinetic and potential energy
 - It has potential energy
 - It has no energy
 - When a spring is compressed, work is done on it. Its elastic potential energy
 - Decreases
 - Disappears
 - increases
 - Does not change
 - Consider following experiment and select the correct option for energy transformation. "A string suspended on a stand is twisted with band and set free."
 - Muscular energy \rightarrow Kinetic energy \rightarrow Potential energy \rightarrow Kinetic energy
 - Frictional energy \rightarrow Potential energy \rightarrow Kinetic energy
 - Muscular energy \rightarrow Potential energy \rightarrow Kinetic energy \rightarrow Potential energy
 - Potential energy \rightarrow Kinetic energy \rightarrow Potential energy \rightarrow Kinetic energy
 - The value of 1 kWh is
 - 3.6×10^5 J
 - 3.6×10^7 J
 - 3.6×10^6 J
 - 3.6×10^9 J

- Work done by tension in the string when a ball tied to a string is being whirled around in a circle is
 - tension depends on mass of stone
 - tension does positive work
 - tension does negative work
 - tension does zero work
- Mike applied 10 N of force over 3 m in 10 seconds. Joe applied the same force over the same distance in 1 minute. Who did more work?
 - Mike
 - both did the same work
 - Joe
 - both did zero work
- A child on a skateboard is moving at a speed of 2 m/s. After a force acts on the child, her speed is 3 m/s. What can you say about the work done by the external force on the child?
 - positive work was done
 - Zero work was done
 - negative work was done
 - Infinite work was done
- The potential energy of a person is maximum
 - sleeping on the ground
 - standing
 - sitting on the ground
 - sitting on the chair
- 1 kW = _____ Joule/sec.
 - 1
 - 10
 - 100
 - 1,000
- Power of a woman is equal to:
 - work x time
 - work /time
 - time/work
 - none of these
- When a body falls freely towards the earth then the total energy
 - increase
 - decrease
 - remains constant
 - first increases and then decreases
- Water stored in a dam possesses:
 - No energy
 - kinetic energy
 - potential energy
 - electrical energy
- What happens to the energy absorbed naturally in water? **(HBBV, 2014)**
 - It is reflected completely
 - It becomes negligible as it is absorbed in water.
 - It can not be used.
 - It is used by aquatic life
- Which of the following statements are true?
 - Potential energy is stored in a system in a sense that, it could later result in motion
 - When block slides on a floor, energy is dissipated in the form of heat
 - SI unit of potential energy is same as work

IV) If friction is neglected, the speed of child at the bottom of a slide does not depend on the shape of slide
(HBBV, 2014)

- (1) I and II (2) I, II and IV
(3) II, III and IV (4) I, II, III and IV

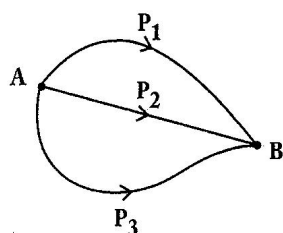
18. One horse power = _____ watt.
(1) 786 (2) 764 (HBBV, 2014)
(3) 748 (4) 746

19. A stone tied with string is in uniform circular motion at 5 rotations/minute.
(HBBV, 2013)

Choose the incorrect statement

- (1) It takes 12 sec to complete one rotation
(2) it has uniform velocity
(3) Its speed depends on the length of the string
(4) It will be thrown tangentially if cut off from the string.

20. Three persons travel from 'A' to 'B' from three different paths P_1 , P_2 and P_3 as shown in the figure. If W_1 , W_2 and W_3 represent respective work done by them, then choose the correct option for above situation.
(HBBV, 2013)



- (1) $W_1 < W_2 < W_3$ (2) $W_2 = W_1 < W_3$
(3) $W_1 = W_2 = W_3$ (4) $W_2 = W_3 > W_1$

21. In an experiment student gathers following data while running up a flight of steps on a staircase. Use this to calculate power utilised by the student.

Number of steps = 27 (HBBV, 2012)

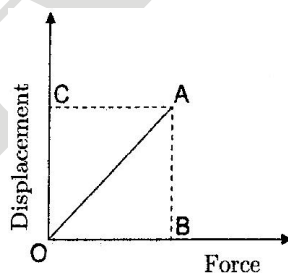
Height of each step = 20 cm

Time taken = 5.4 s

Mass of student 55 kg

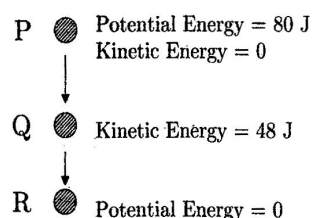
- (1) 400 W (2) 1,485 W
(3) 539 W (4) 664 W

23. Observe the graph and select the correct option to calculate the work done.
(HBBV, 2012)



- (1) 2(Area \square of OBAC)
(2) 2(Area of \triangle OAB)
(3) Area of \square OBAC
(4) Area of \triangle OAC

23. A ball falls to ground as shown below.



What is kinetic energy at R and potential energy at Q?
(HBBV, 2012)

- (1) 80 J, 32 J (2) 0 J, 32 J
(3) 40 J, 40 J (4) 0 J, 40 J

24. Formula of workdone -

- (1) $F \times S$ (2) $P \times F$
(3) $F \times t$ (4) $t \times F$

25. Water cycle, formation of coal, air moving from one place to another are examples of which law?

- (1) Newton's laws (HBBV, 2011)
(2) Law of conservation of energy
(3) Law of gravitational force
(4) Pascal's principle

26. Workdone is a -

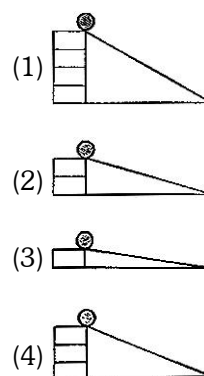
- (1) Scalar quantity (2) Vector quantity
(3) Tensor quantity (4) None of these

27. When force acts in opposite direction to the displacement then work done is

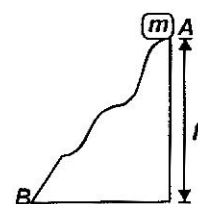
- (1) Positive (2) Zero
(3) Negative (4) Infinity

Application Based Questions

28. In which of the following figures, the ball will have the most kinetic energy when each ball is released from the top of the ramp?



29. In the given smooth curved road, if a particle is released from A then _____.



- (1) Kinetic energy at B must be mgh
(2) Kinetic energy at B may be zero
(3) Kinetic energy at B must be less than mgh
(4) None of these

Use the following diagram to answer questions 30 - 32. Neglect the effect of resistance forces.



30. As the object moves from point A to point D across the surface, the sum of its gravitational potential and kinetic energies ____.
- decreases, only
 - decreases and then increases
 - increases and then decreases
 - remains the same
31. The object will have a minimum gravitational potential energy at point ____.
- A
 - B
 - C
 - D
32. The object's kinetic energy at point C is less than its kinetic energy at point ____.
- A only
 - A, D, and E
 - B only
 - D and E

33. A heavier body and a lighter body have same momentum. Select the correct option for their kinetic energy.
- Both will have same kinetic energy.
 - Heavier body will have more kinetic energy:
 - Lighter body will have more kinetic energy.
 - Kinetic energy of these bodies does not depend on momentum.
34. A body of mass m is revolving along a circular path of radius R with uniform speed ' V '. The work done by it in one complete turn is ____

- $\frac{1}{2}mV^2$
- $\frac{mV^2}{R}$
- Zero
- $\frac{1}{2}mV^2R$

ANSWER KEY

Q.	1	2	3	4	5	6	7	8	9	10
A.	3	4	3	2	3	1	3	4	2	1
Q.	11	12	13	14	15	16	17	18	19	20
A.	2	4	2	3	3	4	4	4	2	3
Q.	21	22	23	24	25	26	27	28	29	30
A.	3	4	1	1	4	1	3	1	1	3
Q.	31	32	33	34						
A.	2	2	3	3						

5. GRAVITATION

1. Acceleration due to gravity increases as ____ increases.
(1) depth (2) height
(3) Latitude (4) Longitude
2. We experience weightlessness when we jump from height, because
(1) air friction reduces
(2) no reaction force acting on us
(3) acceleration due to gravity increases as height decreases
(4) we feel our mass only
3. The ratio of 'g' on two unknown planets 'A' and 'B' is $x : y$. If two identical bodies are projected with the same velocity on these planets, then the ratio of their time of descent is _____. (Neglect air resistance)
(1) $x : y$ (2) $1 : 1$
(3) $x^2 : y^2$ (4) $y : x$
4. Newton's inverse square Law is deduced from Kepler's _____ law of planetary motion.
(1) Universal (2) First
(3) Second (4) Third
5. If the force between bodies of mass 2 kg and 4 kg separated by a distance 8 m is 8.33×10^{-10} N, then the force between them if bodies are shifted to the moon without altering the distance between them will be _____.
(1) 1.38×10^{-10} N (2) 8.33×10^{-10} N
(3) 49.98×10^{-10} N (4) 0.720×10^{-10} N
6. An apple falls from a tree because of gravitational attraction between the earth and apple. If F_1 is the magnitude of force exerted by the earth on the apple and F_2 is the magnitude of force exerted by apple on earth, then
(1) F_1 is very much greater than F_2
(2) F_2 is very much greater than F_1
(3) F_1 is very much little greater than F_2
(4) F_1 and F_2 are equal
7. A stone is released with acceleration 'a' from an upwards moving lift. Find out the acceleration and direction of the stone.
(1) $(g + a)$ in upward direction
(2) $(g - a)$ in downward direction
(3) $(g - a)$ in upward direction
(4) g in downward direction
8. Universal gravitation constant (G) was discovered by _____ in 1798.
(1) Boyle (2) Henry Cavendish
(3) Einstein (4) Galileo Galilei
9. Which of the following statements is correct ?
(1) On moon you would find it too heavy to lift the objects that would be too easy to lift on earth
(2) On earth you would find it too heavy to lift the objects that would be too easy to lift on moon
(3) You would find it some force to lift the objects on moon as well as earth
(4) depends on your mass
10. "The Moon's gravity is only one-sixth that of the Earth". Select the correct option with respect to above given statement.
(1) We can jump higher on the moon than on earth
(2) We weight more on the moon
(3) Moon cannot keep an atmosphere of air around itself
(4) Both (1) and (3)
11. How long does it take for the earth to rotate on its own axis seven times ?
(1) One year (2) One month
(3) One week (4) One day
12. Changes in seasons is caused by
(1) Rotation of Earth
(2) Revolution of Earth
(3) Revolution of Sun
(4) None of these
13. The force of gravitation acts along the line joining the _____ of two bodies.
(1) Centre of mass
(2) Centre of force
(3) Centre of earth
(4) Centre of weight
14. The tides in the sea formed by water level in sea, are due to
(1) Gravitational force of attraction of moon
(2) Gravitational force of attraction of sun
(3) Gravitational force of attraction of earth
(4) (1) and (2) both
15. When an object falls to the ground under the action of earth's gravity, its velocity _____ at constant rate of 9.8 meters per second for every second of time it is falling
(1) decrease (2) increase
(3) remain same (4) depends on mass
16. Acceleration due to gravity acts in the direction of line joining the body _____.
(1) Centre of mass (2) Centre of force
(3) Centre of earth (4) Centre of weight

17. The weight of an object on the moon is less than that on the earth because
 (1) the mass of moon is less than that of earth
 (2) the radius of moon is less than that of earth
 (3) gravitational force of moon due to sun is less than that of earth
 (4) (1) and (2) only

18. The force of gravity on a body varies slightly from place on the earth for two reasons.
 (i) shape of earth and (ii) _____ (?)
 (1) the rotation of earth
 (2) the mass of earth
 (3) the circumference of the earth
 (4) all of these

19. The acceleration of the moon is because of the ?
 (1) Gravitational force exerted on the earth by the moon
 (2) Gravitational force exerted on the moon by the earth
 (3) Gravitational force exerted by the planets
 (4) Gravitational force exerted the sun

20. The distance from the centre of earth to the centre of the moon is called as _____ ?
 (1) orbital length of earth
 (2) orbital radius of earth
 (3) orbital radius of moon
 (4) orbital length of moon

21. Newton applied Huygen's formula to calculate ?
 (1) Centripetal acceleration of the satellite
 (2) Centripetal acceleration of the satellite
 (3) Centripetal acceleration of the earth
 (4) Centripetal acceleration of the sun

22. The motion of falling bodies towards earth is due to the _____ ?
 (1) Gravitational rotation
 (2) Acceleration due to gravity
 (3) Weightlessness
 (4) Gravitational force

23. The force on object placed near the surface is given by the mass 'm' of the object multiplied by acceleration due to gravity, which is equal to its ?
 (1) acceleration "a" (2) momentum "p"
 (3) weight "W" (4) none of these

24. The apparent weight of a person standing in an elevator which is moving down with uniform acceleration will be
 (1) less than its weight on the surface of earth
 (2) same than its weight on the surface of earth
 (3) greater than its weight on the surface of earth
 (4) Twice the weight of on the surface of earth

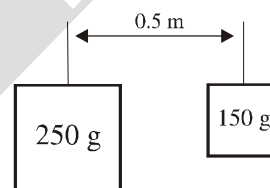
25. If the value of gravitational acceleration at a height h above the earth's surface is the same as that at a depth 'd' below the earth's surface (Which both h and d small compared to the earth's radius R), then
 (1) $h = 2d$ (2) $h = a/2$
 (3) $h = d$ (4) $h = 2d/R$

26. During its orbital period as a planet moves farther away from the sun, the orbital velocity of the planet
 (1) increases (2) decreases
 (3) remains the same (4) all of the answers

27. Your weight depends upon _____.
 (1) your mass
 (2) your distance to the center of earth
 (3) the earth's mass
 (4) all of these

28. If you stood on top a ladder on earth that was as tall as earth's radius, your weight on top the ladder would be :
 (1) one eighth its normal value
 (2) one quarter its normal value
 (3) half its normal value
 (4) none of the above

29. What event will produce the greatest increase in the gravitational force between two masses?



- (1) Doubling the large mass
 (2) Doubling the distance between the masses
 (3) Reducing the small mass by half
 (4) Reducing the distance between the masses by half
30. A particle of mass 2 kg orbits the sun (mass = 1.99×10^{30}) parabolically. Its velocity very far away from the sun is
 (1) 0
 (2) 2.4×10^{15} m/s
 (3) 2.4×10^{30} m/s
 (4) Insufficient information
31. If it is desirable to give a rocket the maximum tangential velocity on its launch, then the best launch site would be :
 (1) one of the poles (2) on the equator
 (3) cape canaveral (4) doesn't matter
32. Which of these can not be deduced from Kepler's Laws
 (i) orbits may be circular
 (ii) the force between two planets goes as J/r^2
 (iii) gravity is conservation force
 (1) (ii) and (iii) only (2) (i) only
 (3) (ii) only (4) (i) and (iii) only

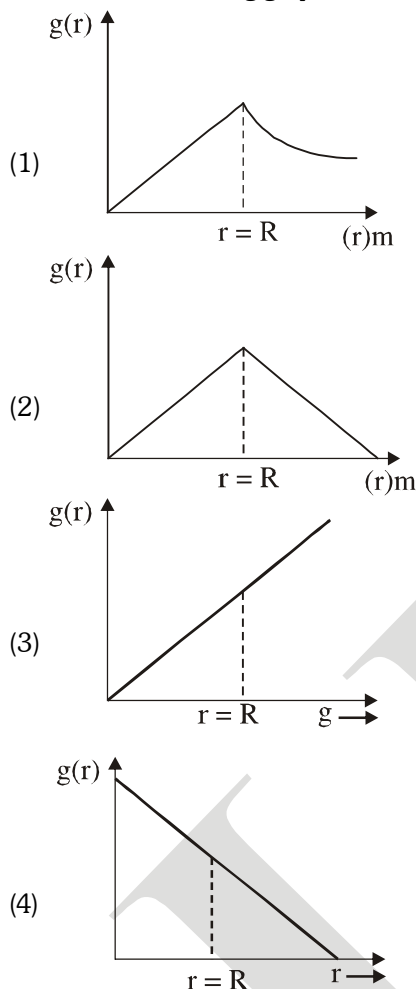
33. Which satellites are used for global positioning system (GPS) ?

- (1) Geostationary (2) Polar
(3) both (1) and (2) (4) neither (1) nor (2)

34. If the time period of a stellite in the orbit of radius r around a planet is T , then the time period of a satellite in the orbit of radius $4r =$ _____.

- (1) $4T$ (2) $2T$
(3) $8T$ (4) $16T$

35. Which of the following graph is correct ?



36. Imagine you throw a ball up in the air. Assume there is no drag interaction. As the ball moves upward there

- (1) is an upward force exerted on the ball by earth
(2) is an downward force exerted on the ball by earth
(3) is an upward force from the hand even though are no longer touching
(4) are no force acting on the ball

37. A flat sheet of paper is dropped from the top of a building. Assume the force exerted on the paper by the earth is the same strength as the force from the drag interaction. The paper

- (1) Slows down
(2) Speeds up
(3) Starts slowing to a stop
(4) Moves at a constant speed

38. In the relation $F = GMm/d^2$, the quantity G

- (1) depends on the value of g at the place of acting force
(2) depends on the masses of bodies
(3) depends on the distance between two bodies
(4) neither of them

39. Calcualte the weight on moon an astronaut whose mass is 72 Kg on moon : ($g = 10 \text{ m/s}^2$)

- (1) 120 N (2) 720 N
(3) 12 N (4) 72 N

40. What is the ratio of acceleration due to gravity on the earth to moon ?

- (1) $\frac{M_m}{M_E} \sqrt{\frac{R_m}{R_E}}$ (2) $\frac{M_E R_m^2}{M_m R_E^2}$
(3) $\frac{M_m R_m^2}{M_E R_E^2}$ (4) $\frac{M_m}{M_E} \sqrt{\frac{R_E}{R_m}}$

ANSWER KEY

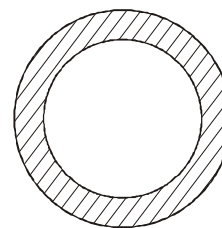
Q.	1	2	3	4	5	6	7	8	9	10
A.	3	2	4	4	2	4	4	2	2	4
Q.	11	12	13	14	15	16	17	18	19	20
A.	3	2	1	4	2	3	4	1	2	3
Q.	21	22	23	24	25	26	27	28	29	30
A.	1	4	3	1	2	2	4	2	4	1
Q.	31	32	33	34	35	36	37	38	39	40
A.	2	1	1	3	1	2	4	4	1	2

6. HEAT

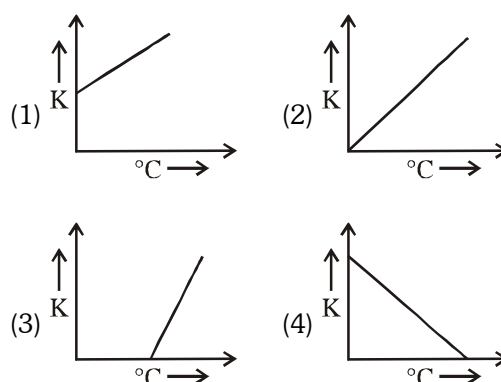
1. When heat energy is incident on a body, then
 - (1) it is reflected
 - (2) it is absorbed
 - (3) it is transmitted
 - (4) all the above
2. Temperature of a body is the measure of
 - (1) Sum total of kinetic and potential energy of the molecules of the given body
 - (2) Amount of heat energy present inside the given body
 - (3) Mechanical vibrations of the body
 - (4) Only average kinetic energy of the molecules present inside the body
3. When ice water is heated, its density
 - (1) Decreases
 - (2) Increases
 - (3) First increases, then decreases
 - (4) First decreases, then increases
4. Among the following represents the smallest temperature change
 - (1) 1 K
 - (2) 1 °C
 - (3) 1 °F
 - (4) Both (1) & (2)
5. If 100 gm of water at 60°C is added to 180 gm of water at 95°C. The resultant temperature of the mixture is
 - (1) 80°C
 - (2) 82.5°C
 - (3) 85°C
 - (4) 77.5°C
6. In a thermos flask, heat loss by conduction and convection can be avoided by
 - (1) Providing vacuum between the two walls of the flask
 - (2) Filling the space between the two walls of the flask with cork which is a bad conductor
 - (3) Providing a shining glass
 - (4) All the above
7. Heat capacity of a body is
 - (1) Dependent on its shape
 - (2) Dependent on its mass
 - (3) Dependent on its temperature
 - (4) None
8. The boiling point of liquid depend on
 - (1) Its nature
 - (2) Its purity
 - (3) Super incumbent pressure
 - (4) All the above
9. The quantity of heat required to raise the temperature of a unit mass of a substance through one degree celsius is
 - (1) Latent heat
 - (2) Mechanical equivalent of heat
 - (3) Specific heat capacity
 - (4) Specific latent heat
10. Snow balls are formed due to
 - (1) Melting of ice
 - (2) Freezing of atmospheric moisture
 - (3) Sublimation
 - (4) None
11. The amount of heat required of 1 gm substance to raise temperature through 1 °C is called
 - (1) thermal energy
 - (2) calorie
 - (3) heat capacity
 - (4) specific heat capacity
12. By increasing the temperature of a liquid its
 - (1) Volume and density decreases
 - (2) Volume and density increases
 - (3) Volume increases and density decreases
 - (4) Volume decreases and density increases
13. Calorimetry is the measurement of
 - (1) Heat
 - (2) Temperature
 - (3) Force
 - (4) Mass
14. When two bodies are in thermal equilibrium, then
 - (1) Temperature of two bodies increases
 - (2) Temperature of two bodies remains the same
 - (3) Temperature of two bodies decreases
 - (4) Temperature of two bodies increases & then decreases
15. Specific heat of a substance can be
 - (1) Finite
 - (2) Infinite
 - (3) Zero
 - (4) Negative
16. If two substances of specific heats S_1, S_2 having masses m_1, m_2 are mixed at the same temperature, effective specific heat of the mixture is
 - (1) $S = \frac{m_1 S_1 - m_2 S_2}{(m_1 + m_2)}$
 - (2) $S = \frac{m_1 S_1 + m_2 S_2}{(m_1 + m_2)}$
 - (3) $S = \frac{m_1 S_1 - m_2 S_2}{(m_1 - m_2)}$
 - (4) $S = \frac{m_1 S_1 + m_2 S_2}{(m_1 - m_2)}$
17. The heat capacity of material depends upon
 - (1) Structure of matter
 - (2) Temperature of matter
 - (3) Density of matter
 - (4) Specific heat of matter
18. The coefficient of linear expansion α is ____ that of coefficient of areal expansion.
 - (1) double of
 - (2) triple of
 - (3) half of
 - (4) equal of
19. The real expansion of a liquid does not depend on
 - (1) Nature of the liquid
 - (2) Temperature difference of liquid
 - (3) Initial volume of the liquid
 - (4) Nature of container

- 20.** The relation between heat capacity 'Q' and specific heat 'S' is
 (1) $Q = ms$ (2) $Q = m/s$
 (3) $Q = s/m$ (4) $Q = m + s$
- 21.** Which is the absolute scale of temperature
 (1) Celsius (2) Kelvin scale
 (3) Fahrenheit scale (4) None
- 22.** Convert -40°F into Celsius ?
 (1) 40°C (2) -40°C
 (3) 233°C (4) None
- 23.** The unit for volume coefficient of volume expansion is -
 (1) $^\circ\text{C}^{-1}$ (2) K^{-1}
 (3) $^\circ\text{F}^{-1}$ (4) All of these
- 24.** Two bodies A and B are said to be in thermal equilibrium with each other if they have same
 (1) mass (2) heat energy
 (3) Temperature (4) Specific heat capacities
- 25.** Relation between real and apparent coefficients of expansion of liquid is given by
 (1) $r_R = r_a + r$ (2) $r_R = r_a - r$
 (3) $r_R = \frac{r_a}{r}$ (4) $r_R = r_a \cdot r$
- 26.** Expansion of liquids on heating is different from the solids, since the expansion of liquid
 (1) Much more than solids because molecular spacing in them is less
 (2) Much more than solids because molecular spacing in them is more
 (3) Much less than solids because molecular spacing in them is more
 (4) Much less than solids because molecular spacing in them is less
- 27.** At what temperature the celsius and Fahrenheit readings are the same ?
 (1) -40° (2) $+40^\circ$
 (3) 54° (4) None
- 28.** Absolute zero is the condition at which
 (1) Molecular motion ceases(stops)
 (2) Gas becomes liquid
 (3) Matter becomes massless
 (4) Random motion of molecules occur
- 29.** The temperature of a substance is increased by 27°C on the Kelvin scale, this increase is
 (1) 300 K (2) 246 K
 (3) 27 K (4) 7 K
- 30.** If a substance contracts on heating, its coefficient of linear expansion is
 (1) positive (2) Negative
 (3) Zero (4) Infinity

- 31.** An annular ring of aluminium is cut from an aluminium sheet as shown. When this ring is heated



- (1) the aluminium expands outward and the hole remains the same in size
 (2) the hole decreases in diameter
 (3) the area of the hole expands the same percent as any area of the aluminium
 (4) the area of the hole expands a greater percent than any area of aluminium
- 32.** The gaps are kept in the railway track so that
 (1) The friction is produced and the speed of the train may not increase beyond a limit
 (2) The friction between the wheels and track decreases
 (3) The replacement of the track is easier when there is fault in the track
 (4) The expansion of the track can take place due to friction as well as in summer
- 33.** If specific heat of a substance is infinite, it means
 (1) Heat is given out
 (2) Heat is taken in
 (3) No change in temperature takes place
 (4) All of above
- 34.** Energy from the sun reaches the earth by
 (1) Scattering (2) Conduction
 (3) Radiation (4) Convection
- 35.** The running of fan makes us comfortable during summer, because it
 (1) Decreases the temperature of air
 (2) Increases the thermal conductivity of air
 (3) Increases the rate of evaporation of perspiration
 (4) cuts off the thermal radiation reaching its
- 36.** A graph was plotted taking the temperature in $^\circ\text{C}$ along the X-axis and the corresponding temperature in kelvin along the Y-axis which of the curves in figure most correctly represents this behavior ?



- 37.** Under steady state, the temperature of a body
 (1) Increases with time
 (2) Decreases with time
 (3) Does not change with time and is same at all points of the body
 (4) Does not change with time but is different at different cross section of the body
- 38.** A glass tumbler containing ice shows droplets of water on the outer surface because
 (1) The outer surface of the tumbler shows hygroscopic effect
 (2) Water from inside oozes out through the wall of the tumbler
 (3) The moisture in the air on coming in contact with the wall surface of the tumbler condenses in the form of droplets of water
 (4) Both (1) and (2)
- 39.** The heat of fusion of ice is 80 cal/gm. This means 80 cal. of energy are required to
 (1) Raise the temperature of 1 gm of water by 1K
 (2) Turn 1 gm of water to steam
 (3) Raise the temperature of 1gm of ice by 1K
 (4) Melt 1 gm of ice
- 40.** 450 J of energy supplied to 10 gm of water will raise its temperature by
 (1) 1°C (2) 4.2°C
 (3) 10°C (4) 42°C

ANSWER KEY

Q.	1	2	3	4	5	6	7	8	9	10
A.	4	4	3	3	2	1	2	4	3	2
Q.	11	12	13	14	15	16	17	18	19	20
A.	4	3	1	2	1	2	4	3	4	1
Q.	21	22	23	24	25	26	27	28	29	30
A.	2	2	4	3	1	2	1	1	3	2
Q.	31	32	33	34	35	36	37	38	39	40
A.	3	4	3	3	3	1	3	3	4	3

7. ELECTRICITY

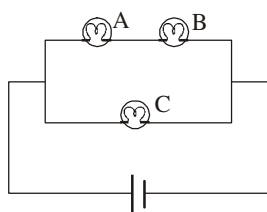
- The existence of negative charge on a body implies that it has
 - (1) Lost some of its electrons
 - (2) Lost some of its protons
 - (3) Acquired some electrons from outside
 - (4) Acquired some protons from outside
- When glass rod is rubbed with silk, both become charged due to
 - (1) Migration of protons
 - (2) Exchange of electrons and protons
 - (3) Migration of electrons
 - (4) Migration of neutrons
- The electrostatic force between two point charges q_1 and q_2 at separation 'r' is given by

$$F = K \cdot \frac{q_1 q_2}{r^2}$$
 The constant 'K'
 - (1) depends on the system of unit only
 - (2) depends on the medium between the charges only
 - (3) depends on both the system of units and the medium between the charges
 - (4) is independent of both the system of units and the medium between the charges
- Which one is a process of generation of charge on objects
 - (1) conduction
 - (2) induction
 - (3) friction
 - (4) all of the above
- The device which is use to defect presence of charge on any object is
 - (1) Galvanometer
 - (2) Leaf electroscope
 - (3) Charge electroscope
 - (4) Voltmeter
- Which one is not an example of frictional electricity
 - (1) Glass and rubbed with silk then glass rod become positively charged
 - (2) Lightening during thunderstorm
 - (3) When balloon rubbed with hair, if become negatively charged
 - (4) Ebonite rod rubbed with far then ebonite rod become positively charged
- When positively charged glass rod bring near to the metallic bob of leaf electroscope then
 - (1) Both Gold leaves become positively charged
 - (2) Both Gold leaves become negatively charged
 - (3) One become positively charged and other negatively charged
 - (4) No charges generate on leaves
- When we make contact of positively charged conductor with metallic bob of leaf electroscope then
 - (1) Both Gold leaves become positively charged
 - (2) Both Gold leaves become negatively charged
 - (3) One become positively charged and other negatively charged
 - (4) No charges generate on leaves
- Sure test of electrification is
 - (1) Attraction
 - (2) Induction
 - (3) Friction
 - (4) Repulsion
- Which statement is correct
 - (1) Gravitational force > Electrostatic force
 - (2) Electrostatic force > Gravitational force
 - (3) Electrostatic force = Gravitational force
 - (4) No relation between strength of above forces
- Which statement/statements is/are correct
 - (i) An ammeter is connected in series in circuit and voltmeter is connected in parallel
 - (ii) An ammeter has high resistance
 - (iii) A voltmeter has a low resistance
 - (1) i, ii, iii
 - (2) i, ii
 - (3) ii, iii
 - (4) i
- A student has made a mistake in this circuit. What is that mistake ?

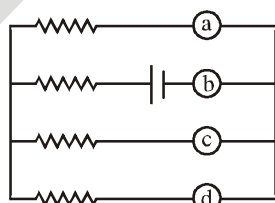
 - (1) All cell's must not connected together in combination
 - (2) Ammeter is connected in parallel and voltmeter connected in series
 - (3) Two bulbs are connected in series they must be in parallel connection
 - (4) No mistake in circuit
- Resistance of conductor depends on
 - (1) length of conductor
 - (2) diameter of conductor
 - (3) material of conductor
 - (4) All of the above
- Choose the incorrect statement from the following :
 - (1) Cation moves towards cathode during the process of electrolysis
 - (2) Electrolysis is a process of decomposition of electrolyte by the action of electric current
 - (3) Anion moves towards cathode during the process of electrolysis
 - (4) Both (2) and (3)

Paragraph (Q.15 & Q.16)

Consider the circuit given below where A, B and C are three identical light bulbs of constant resistance.

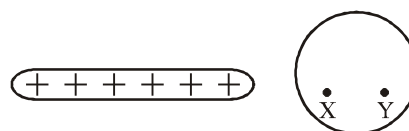


- 15.** If 'C' burns out, what will be brightness of 'A' compared with before
 (1) Decreases (2) Increases
 (3) Remains same (4) 'A' will not lit
- 16.** If 'B' burns out instead, what will be the brightness 'A' and 'C' compared with before
 (1) brightness of 'A' decreases & brightness of 'C' increases
 (2) brightness of 'A' increases & brightness of 'C' decreases
 (3) 'A' will not lit & brightness of 'C' increases
 (4) 'A' will not lit & brightness of 'C' remains same
- 17.** Device used to only detect the current in circuit is
 (1) Ammeter
 (2) Galvanometer
 (3) Potentiometer
 (4) Voltmeter
- 18.** The S.I. unit of conductivity is
 (1) $\Omega \cdot m$ (2) Ω / m
 (3) $\frac{s}{m}$ (4) $\frac{m}{s}$
- 19.** Which of the following statement is not true with reference to static electricity?
 (1) Electric charge is weak
 (2) Charge is developed due to rubbing of specific substances
 (3) Charge lasts for shorter time duration
 (4) Static electricity can not create electric field
- 20.** Which will be most appropriate position to connect the ammeter, so the current supplied to the circuit is measure with maximum accuracy



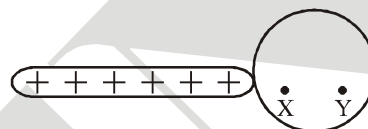
- (1) a (2) b
 (3) c (4) d

- 21.** Which statement is correct for the given diagram



- (1) Positive charges will accumulate at 'X' and negative charges at 'Y'
 (2) Negative charges will accumulate at 'X' and Positive charges at 'Y'
 (3) Positive charges will accumulate at 'X' and 'Y' both position
 (4) Negative charges will accumulate at 'X' and 'Y' both position

- 22.** Which statement is correct for the given diagram



- (1) Positive charges will accumulate at 'X' and negative charges at 'Y'
 (2) Negative charges will accumulate at 'X' and Positive charges at 'Y'
 (3) Sphere will be positively charged
 (4) Sphere will be negative charged

- 23.** An electrolyte is

- (1) A cell
 (2) A metal
 (3) A liquid that conduct electricity
 (4) Sugar

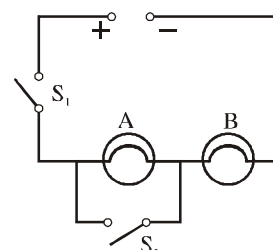
- 24.** When we pay for our electricity bill, we are paying for the ____.

- (1) Charge used (2) Current used
 (3) Power used (4) Energy used

- 25.** Fuse blows because ____.

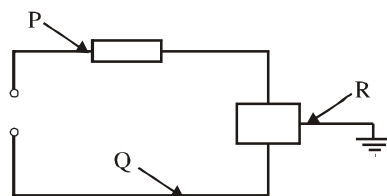
- (1) there is a high voltage connected across the circuit
 (2) there is a high current flowing through the circuit
 (3) there is a high charge that has passed through the circuit
 (4) the effective resistance of the circuit is too high

- 26.** Using the circuit given below, state which of the following statement is correct?

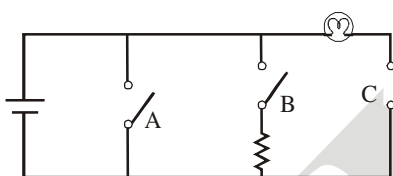


- (1) When S_1 and S_2 are closed, lamp A and B are lit
 (2) With S_1 open S_2 closed, A is lit and B is not lit
 (3) With S_2 open and S_1 closed A and B are lit
 (4) With S_1 closed and S_2 open, lamp A remain lit even if lamp 'B' gets fused

27. Which of the following wires shown below are the live, neutral and earth wires ?



- (1) P-Neutral, Q-live, R-Earth wire
(2) P-Live wire, Q-Neutral, R-Earth wire
(3) P-Live wire, Q-Live wire, R-Earth wire
(4) P-Neutral, Q-Neutral, R-Earth wire
28. The commercial unit of electric energy is
(1) Kilo-Joule (2) Joule
(3) Kilowatt-hour (4) All of the above
29. Due to frictional electricity which property of object get changed ?
(1) Only charge (2) Only mass
(3) Both charge & mass (4) None
30. Which switch in the given circuit, when closed will produce short circuiting ?



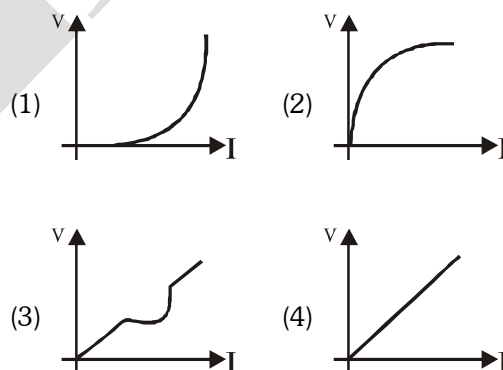
- (1) A (2) B
(3) C (4) None
31. Which of the following is not true about emf of a cell
(1) It is maximum voltage obtainable from the cell
(2) It is responsible for the flow of steady current in the cell
(3) Work calculated from it is not the maximum work obtainable from the cell
(4) It is the potential difference between two electrodes when no current is flowing in circuit
32. (Volt. Ampere. Sec) is unit of
(1) Electric power
(2) Electric Energy
(3) EMF
(4) Such unit does not exist
33. In electric circuit '



is symbol of

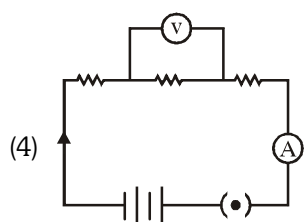
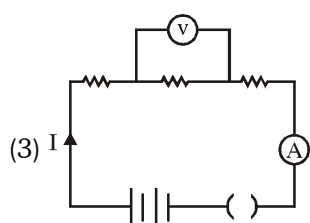
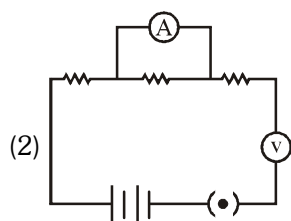
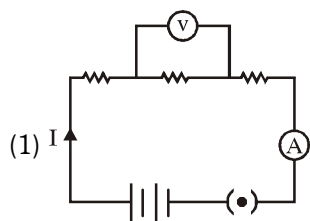
- (1) An electric cell
(2) Battery
(3) A wire joint
(4) Series connection

34. The electrical resistivities of there materials A, B & C are given below, which one is good conductor
A $\rightarrow 110 \times 10^{-8} \Omega\text{m}$
B $\rightarrow 1.0 \times 10^{10} \Omega\text{m}$
C $\rightarrow 10.0 \times 10^{-8} \Omega\text{m}$
(1) A (2) B
(3) C (4) None
35. Current rating of the electrical circuit increases
(1) due to series connection of cells
(2) due to parallel connection of cells
(3) due to series and parallel combination of cells
(4) all of the above
36. The earth wire is connected to the outer casing of the appliances because _____.
(1) The earth wire can prevent the fuse from bellowing
(2) The earth wire can carry leaked charges to the ground
(3) The outer casing is an insulator and therefore it can store charges
(4) The earth wire can conduct the heat away from the appliances
37. Which is the graph between v-I in ohmic conductor



38. When glass rod rubbed with silk then charge acquired by glass rod is $1.6 \times 10^{-12}\text{C}$, then charge acquired by silk is
(1) $1.6 \times 10^{-12}\text{C}$
(2) $-1.6 \times 10^{-12}\text{C}$
(3) $\pm 1.6 \times 10^{-12}\text{C}$
(4) None
39. Direction of flow of current through conductor and electric field is
(1) Same
(2) Opposite
(3) Current has direction but electric field doesn't have direction
(4) None of the above

40. Identify the correct diagram



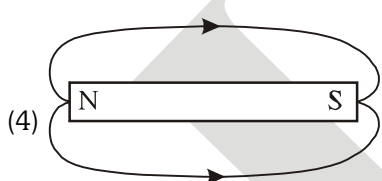
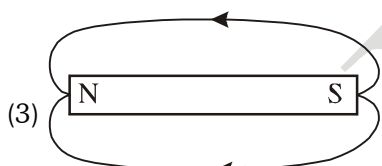
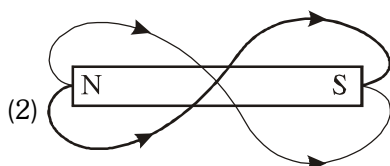
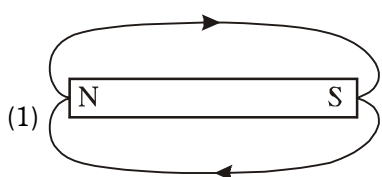
ANSWER KEY

Q.	1	2	3	4	5	6	7	8	9	10
A.	3	3	3	4	2	4	2	1	4	2
Q.	11	12	13	14	15	16	17	18	19	20
A.	4	2	4	3	3	4	2	3	4	2
Q.	21	22	23	24	25	26	27	28	29	30
A.	2	3	3	4	2	3	1	3	3	1
Q.	31	32	33	34	35	36	37	38	39	40
A.	3	2	2	3	2	2	4	2	1	1

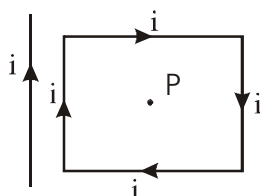
8. MAGNETISM

1. The magnetic field inside a long solenoid carrying current.
 - (1) is zero
 - (2) decreases as we move towards its end
 - (3) increases as we move towards its end
 - (4) is the same at all points
2. Whose magnetic field is like a magnetic field of a bar magnet ?
 - (1) Current carrying wire
 - (2) Current carrying ring
 - (3) Current carrying solenoid
 - (4) Current carrying rectangle loop
3. Force on a conductor in a magnetic field depends on ?
 - (1) Length of the conductors
 - (2) Current in the conductors
 - (3) Magnetic field
 - (4) All of the above
4. The magnitude and direction of magnetic field around by a straight current carrying wire at a given points depends on ?
 - (1) Current in the wire
 - (2) Direction of the current
 - (3) Distance of the point from the wire
 - (4) All of the above
5. A bar magnet is placed in the North-South direction with its North pole towards North. In which direction from the centre of the magnet will the points of zero magnetic field lie ?
 - (1) North and South
 - (2) East and West
 - (3) North-East and South-West
 - (4) North-West and South-West
6. If a Bar magnet is cut into 3 parts length wise, the total number of poles will be -
 - (1) 2 (2) 3 (3) 4 (4) 6
7. Magnetic field around a straight current carrying wire. When will the strength of the magnetic field increases ?
 - (1) The magnitude of the current increases
 - (2) The distance from the wire increases
 - (3) The length of wire increases
 - (4) The thickness of the wire increases
8. The magnetic field lines inside a current carrying solenoid are _____.
 - (1) along the axes and parallel to each other
 - (2) perpendicular to the axis and equidistant from each other
 - (3) circular and they do not intersect each other
 - (4) circular at the ends but they are parallel to the wire inside the solenoid
9. A magnetic field exerts no force on
 - (1) an electric charge moving perpendiculars to it's direction
 - (2) an unmagnetised iron bar
 - (3) a stationary electric charge
 - (4) a magnet
10. An electric charge in uniform motion produce
 - (1) An electric field only
 - (2) A magnetic field only
 - (3) Both electric & magnetic field
 - (4) None of the above
11. The work done on a charged particle having charge q and moving in a circular path of radius r in a constant magnetic field is _____.
 - (1) Infinite (2) Zero
 - (3) qr (4) q/r
12. Which of the following is not associated with Fleming's left hand rules ?
 - (1) Resistance (2) Magnetic field
 - (3) Force (4) Current
13. Which of the following is not associated with right hand rule ?
 - (1) Resistance (2) Magnetic field
 - (3) Force (4) Current induced
14. A magnet is moved towards a coil
 - (1) Current induced in a coil increased
 - (2) Current induced in a coil decreased
 - (3) Current induced in a coil may be increased or decreased
 - (4) None of these
15. The north pole of a magnet is brought near a coil. Then the current induced in the coil as seen the observer on the side of magnet will be -
 - (1) In the clockwise direction
 - (2) In the anticlockwise direction
 - (3) Initially in the clockwise and then anticlockwise direction
 - (4) Initially in the anticlockwise and then clockwise direction
16. In an AC generator, the maximum number of lines of force passes through the coil when the angle between the plane of coil and lines of force is
 - (1) 0° (2) 60°
 - (3) 30° (4) 90°
17. A loop of wire is rotated about an axes normal to a uniform magnetic field. The direction of induced current reverses one after every _____.
 - (1) one forth rotation (2) half rotation
 - (3) one rotation (4) two rotation

18. What is the most appropriate reason for the popularity of AC over DC ?
 (1) AC is not continuous
 (2) DC cannot be generated
 (3) There is very little loss of energy while AC transmission
 (4) There is very little gain of energy while AC transmission
19. The frequency of AC in India is 50 Hz. How many times the current becomes zero in are second ?
 (1) 50 times (2) 100 times
 (3) 200 times (4) 25 times
20. Magnetic field line of a bar magnet is correctly shown in which the following figure -



21. Along the direction of current carrying wire, the value of magnetic field is _____.
 (1) zero
 (2) infinity
 (3) depends on the length of wire
 (4) uncertain
22. A wire is lying parallel to a square coil as shown in figure. If the same value of current is flowing in both of them in the directions shown in the figure, the magnetic field at point P will be



- (1) zero
 (2) more than that produced by the coil alone
 (3) less than that produced by the coil alone
 (4) equal to that produced by the coil alone
23. Magnetic field is not associated with
 (1) a charge in uniform motion
 (2) an accelerated charge
 (3) a decelerated charge
 (4) a stationary charge
24. Which of the following rays are not deflected by magnetic field ?
 (1) α - rays (2) β - rays
 (3) γ rays (4) positive rays
25. Two parallel conductors carrying current in the same direction
 (1) repel each other
 (2) attract each other
 (3) sometimes attract & sometimes repel each other
 (4) none of these
26. The two poles in the magnet have
 (1) equal pole strength
 (2) unequal pole strength
 (3) can be same or different
 (4) none of these
27. Magnetic field lines _____.
 (1) form closed continuous loops
 (2) cannot intersect
 (3) are crowded near poles
 (4) all of these
28. Who had first observed the magnetic effect of an electric current first ?
 (1) Faraday (2) oersted
 (3) volt (4) Ampere
29. Frequency of AC in India is
 (1) 50 Hz (2) 60 Hz
 (3) 110 Hz (4) 220 Hz
30. Device that converts electrical energy into - mechanical energy is
 (1) AC generators (2) Cell
 (3) DC generators (4) DC moter
31. A magnet can be demagnetized by
 (1) heating the magnet
 (2) putting it in the water
 (3) cooling it
 (4) putting in contact with iron
32. The device used to produce electric current is called a
 (1) generator (2) galvanometer
 (3) ammeter (4) electric motor

- 33.** What is true about electric generator ?
 (1) It works on the principle of electromagnetic induction
 (2) Converts mechanical energy into electrical energy
 (3) It can be produced both direct and alternating current
 (4) All of the above
- 34.** Direction of force acting on a current carrying conductor kept in a magnetic field is
 (1) Fleming's right hand rule
 (2) Fleming's left hand rule
 (3) Lenz's law
 (4) Faraday's law
- 35.** The electric device which works on the phenomenon of force on a current-carrying conductor in a magnetic field is
 (1) generator (2) accelerator
 (3) motor (4) transformer
- 36.** Magnets having temporary magnetism are called
 (1) electromagnets
 (2) bar magnets
 (3) circular magnets
 (4) Horse-shoe magnets
- 37.** The power of a DC motor can be increase by
 (1) increasing the area of the cross section of the coil
 (2) increasing the current flowing through the coil
 (3) inducting the soft iron core
 (4) all of the above
- 38.** For dynamo, which one of the following statements are correct ?
 (1) It converts the electrical energy into light energy
 (2) It converts the kinetic energy into heat energy
 (3) It converts the mechanical energy into electrical energy
 (4) It converts the electrical energy into mechanical energy
- 39.** AC generator can be converted into DC generator by replacing
 (1) Armature with coil
 (2) concave magnet with horse shoe magnet
 (3) slip rings with split rings
 (4) all of the above
- 40.** The frequency of DC is
 (1) Zero (2) Negative
 (3) Infinite (4) 50 Hz

ANSWER KEY

Q.	1	2	3	4	5	6	7	8	9	10
A.	4	3	4	4	2	4	1	1	3	2
Q.	11	12	13	14	15	16	17	18	19	20
A.	2	1	1	1	1	4	2	3	2	4
Q.	21	22	23	24	25	26	27	28	29	30
A.	1	2	4	3	2	1	4	2	1	4
Q.	31	32	33	34	35	36	37	38	39	40
A.	1	4	4	2	3	1	4	3	3	1

9. LIGHT (REFLECTION AND REFRACTION)

- An object moves towards a convex mirror, the image
 - (1) Magnification increases
 - (2) Moves towards the mirror
 - (3) Neither (1) nor (2)
 - (4) Both (1) and (2)
- Light appears to travel in a straight line because :
 - (1) It passes by the atmosphere
 - (2) Its wavelength is very small
 - (3) Its velocity is very large
 - (4) It is a form energy
- A convex lens forms a virtual image if object is placed :
 - (1) Between the lens and its focus
 - (2) At the focus of the lens
 - (3) Between 'F' and '2F'
 - (4) At infinity
- A concave mirror is placed on a table with its pole touching the table. The mirror is rotated about its principal axis in clockwise direction. The image of a person looking straight into it
 - (1) Rotates in clockwise direction
 - (2) Rotates in anti-clockwise direction
 - (3) Is inverted
 - (4) Does not rotate
- If μ_v, μ_r, μ_b are refractive indices of violet, red and blue respectively in a given medium then
 - (1) $\mu_v = \mu_b = \mu_r$
 - (2) $\mu_v > \mu_b < \mu_r$
 - (3) $\mu_v > \mu_b > \mu_r$
 - (4) $\mu_v < \mu_b < \mu_r$
- Determine the thickness of the glass through which light can pass in 5×10^{-11} second ($\mu_g = 1.5$)
 - (1) 5 mm
 - (2) 8 mm
 - (3) 10 mm
 - (4) 1 mm
- The focal length of the normal human eye is _____ cm.
 - (1) Equal to 2.5
 - (2) > 2.5
 - (3) < 2.5
 - (4) Both (1) and (3)
- If two plane mirrors are placed with the reflecting surfaces perpendicular to each other, which of the following statements is true ?
 - (1) The rays incident on the first mirror and the rays reflected from the second mirror are always parallel.
 - (2) The rays incident on the first mirror and the rays reflected from the second mirror are perpendicular
 - (3) The angle of deviation lies between 90° and 180°
 - (4) None of the above
- Time taken by the sunlight to pass through a window made of glass of 5 mm thickness is _____ sec. ($\mu_g = 1.5$)
 - (1) 2.5×10^{-11}
 - (2) 0.4×10^{-8}
 - (3) 4×10^{-8}
 - (4) 2.5×10^{-5}
- The angle between the reflecting surface and the reflected ray is called _____.
 - (1) Glancing angle of reflection
 - (2) Glancing angle of incidence
 - (3) Angle of reflection
 - (4) Angle of incidence
- Find out the correct options from the following :
 - (a) The magnification is positive for all virtual images and is negative for all real images
 - (b) The magnification of concave lens and convex mirror is always positive where as the magnification of convex lens and convex mirror can be positive or negative depending on the position of the object before the lens
 - (1) only (a) is true
 - (2) only (b) is true
 - (3) Both (a) and (b) are true
 - (4) Both (a) and (b) are false
- When object is kept between two plane mirrors making certain angle, 5 images are formed. What is the measure of an angle between the plane mirror ?
 - (1) 72°
 - (2) 90°
 - (3) 120°
 - (4) 60°
- When a monochromatic ray of light travels from a medium of refractive index n_1 to a medium of refractive index n_2 ($n_2 > n_1$) is
 - (1) Speed increases by a factor n_2/n_1
 - (2) Speed decreases by a factor n_2/n_1
 - (3) Frequency decreases by a factor n_2/n_1
 - (4) Wavelength increases by a factor n_2/n_1
- For a concave mirror, whenever the distance of the object is less than the focal length, the image is virtual. That is called virtual image, because
 - (1) The image is formed behind the mirror
 - (2) The image is not inverted
 - (3) The image can not be obtained on screen
 - (4) The image can be located by virtue of parallax
- The minimum distance between an object and its real image formed by a convex lens is
 - (1) $2/3 f$
 - (2) $2 f$
 - (3) $5/2 f$
 - (4) $4 f$

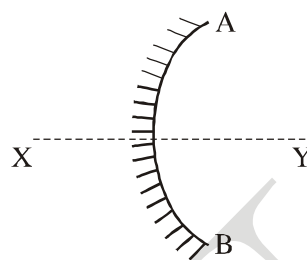
- 16.** A plane mirror is moved towards a stationary observer with speed of 4 m/s. The speed with which his image will move towards him ?
(1) 2 m/s
(2) 4 m/s
(3) 8 m/s
(4) the image will stay at rest
- 17.** Choose the only wrong statement from the following
(1) A convex mirror forms virtual images for all position of the object
(2) A convex mirror forms real images for all position of the object
(3) A convex mirror, if suitably placed in front of an object, can form a unity
(4) The magnification produced by a convex mirror is always less than unity
- 18.** A plane mirror produces a magnification of
(1) infinity
(2) 1
(3) zero
(4) between '0' and '+infinity'
- 19.** A concave mirror gives an image three times as large as the object placed at a distance of 20 cm from it. For the image to be real, the focal length should be
(1) 10 cm (2) 15 cm
(3) 20 cm (4) 30 cm
- 20.** When light goes from a certain substances into air, the critical angle is 30° . What is the refractive index of the substance ?
(1) 0.5 (2) 1
(3) 3 (4) 2
- 21.** The sun appears to be oval in morning and evening due to following phenomenon :
(1) Reflection of light in atmosphere
(2) Total internal reflection of light
(3) Refraction of light in atmosphere
(4) Both (1) & (3) are correct
- 22.** Out of the following select the correct statement :
(1) Refractive index, frequency and deviation are maximum for red colour
(2) If there was no atmosphere, the length of the day on the earth would increases
(3) For greater value of ' μ ', the angle of deviation increases
(4) Star appears to twinkle due to dispersion of light
- 23.** When white light enters a prism, it gets split into its constituent colours. This is due to
(1) High density of prism material
(2) Value of ' μ ' is different for different colors
(3) Diffraction of light
(4) Velocity changes for different frequency
- 24.** A plane mirror lying on the ground is not visible from all direction. But a piece of paper can be seen from any direction.
(1) Due to regular reflection
(2) Due to diffused reflection
(3) Due to irregular reflection
(4) Due to scattering
- 25.** Angle of refraction, when light incident parallel to normal on water surface from air is
(1) $\angle r = 90^\circ$
(2) $\angle r = 0^\circ$
(3) $\angle r < 90^\circ$
(4) $45^\circ < \angle r < 90^\circ$
- 26.** Total internal reflection takes place when light is passing from :
(1) air to water (2) air to glass
(3) water to glass (4) glass to water
- 27.** What is speed of light in quartz having refractive index of 4.54, if its speed in air is 3×10^8 m/s.
(1) 1.94×10^8 m/s
(2) 1.5×10^8 m/s
(3) 1.34×10^8 m/s
(4) 2.45×10^8 m/s
- 28.** One of the following does not apply to concave mirror. This is
(1) Focal length is negative
(2) Image distance can be positive or negative
(3) Image distance is always positive
(4) Height of image can be positive or negative
- 29.** Linear magnification produced by a concave mirror may be :
(1) less than 1 or equal to 1
(2) more than 1 or equal to 1
(3) less than 1, more than 1 or equal to 1
(4) less than 1 or more than 1
- 30.** A boy is standing in front and close to a mirror. He finds the image of his head bigger than normal, the middle part of his body of the same size, and his legs smaller than normal. The spherical mirror is made up of three types of mirrors in the following order from top to bottom.
(1) convex, plane, concave
(2) plane, convex, convex
(3) concave, plane, convex
(4) convex, concave, plane
- 31.** A ray of light is incident on a plane mirror making an angle of 90° with the mirror surface. The angle of reflection for this ray of light will be
(1) 45° (2) 90°
(3) 0° (4) 60°

32. The figure given along side the image of a clock as seen in plane mirror. The correct time is

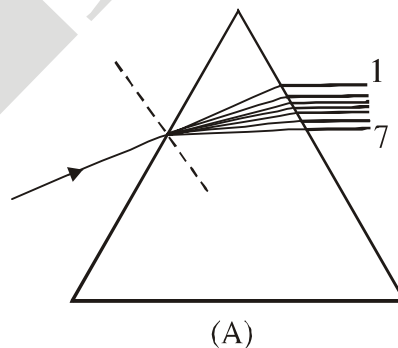


- (1) 2.25 (2) 2.35
(3) 6.45 (4) 9.25
33. Refractive indices of water, sulphuric acid, glass and carbon disulphide are 1.33, 1.43, 1.53 and 1.63 respectively. The light travels slowest in
(1) Sulphuric Acid
(2) Glass
(3) Water
(4) Carbon disulphide
34. A small bulb is placed at the focal point of a converging lens. When the bulb is switched on, the lens produces.
(1) a convergent beam of light
(2) a divergent beam of light
(3) a parallel beam of light
(4) a patch of coloured light
35. A burning candle whose flame is 1.5 cm tall is placed at a certain distance in front of a convex lens. An image of candle flame is received on a white screen kept behind the lens. The image of flame also measures 1.5 cm. If 'f' is the focal length of a convex lens, the candle is placed
(1) at f
(2) between 'f' and '2f'
(3) at 2f
(4) beyond '2f'
36. A light from a far off star comes down towards earth
(1) It bends away from the normal
(2) It bends towards the normal
(3) It does not bend at all
(4) It is reflected back
37. A student has to do experiment on finding the focal length of a given convex lens by using a distant object. She can do her experiment if she is also made available.
(1) a lamp and a screen
(2) a scale and a screen
(3) a lamp and a scale
(4) only a screen

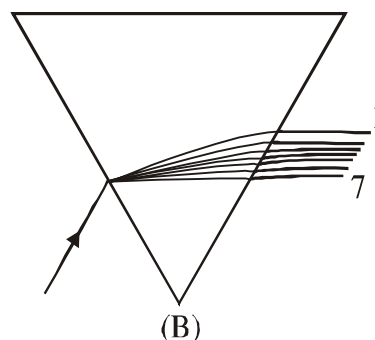
38. A mirror AB of focal length 'f', shown in figure, is cut along the line XY. What will be the focal length of each piece ?



- (1) 2f (2) f
(3) f/2 (4) f²
39. A beam of light is passing through a prism. Which of the following object should be held between the spectrum obtained from the prism, so that the original beam of light will be visible again
(1) If another similar prism is held in upside down position
(2) If another similar prism is held in same position as original
(3) If a convex lens is kept at a distance of its focal length from the prism
(4) If a plain glass is held at a random distance
40. From the following figure



(A)



(B)

1st light in (A) & 7th light in (B) is

- (1) Red, Violet
(2) Violet, Red
(3) Red, Red
(4) Violet, Violet

ANSWER KEY

Q.	1	2	3	4	5	6	7	8	9	10
A.	4	2	1	4	3	3	4	1	1	1
Q.	11	12	13	14	15	16	17	18	19	20
A.	3	4	2	3	1	2	2	2	2	4
Q.	21	22	23	24	25	26	27	28	29	30
A.	3	3	2	2	2	4	1	3	3	3
Q.	31	32	33	34	35	36	37	38	39	40
A.	3	4	4	3	3	2	2	2	1	3

10. REFLECTION OF SOUND

1. Echo is heard when
 - (1) Time interval between original sound and reflected sound is more than $1/100$ sec.
 - (2) Time interval between original sound and reflected sound is more than $1/10$ sec.
 - (3) Time interval between original sound and reflected sound is less than $1/10$ sec.
 - (4) Time interval between original sound and reflected sound is less than $1/100$ sec.
2. Raju has lower voice frequency, so pitch is lower and the sound of low pitch is said to be.
 - (1) Flat
 - (2) Intensity
 - (3) Shrill
 - (4) Quality
3. If 1200 waves are passing through a point in medium in 60 sec and wave speed is 300 m/s. Find the wavelength
 - (1) 15 m
 - (2) 15 cm
 - (3) 72 m
 - (4) 45 m
4. When a longitudinal wave passes through a medium there is
 - (1) no change in pressure and density
 - (2) change in pressure
 - (3) change in density
 - (4) variation in pressure and density
5. Sound wave travels fastest in ...
 - (1) Distilled water
 - (2) Kerosene oil
 - (3) Brass
 - (4) Oxygen
6. If the distance between a compression and the adjacent rarefaction of a longitudinal wave is 2 cm. Find the wavelength of longitudinal wave.
 - (1) 4 m
 - (2) 0.04 m
 - (3) 2 cm
 - (4) 0.02 m
7. Decibel is a
 - (1) Musical note
 - (2) Unit of intensity of sound
 - (3) Musical instrument
 - (4) Unit of Wavelength
8. When a sound wave passes from a highly polluted region to a pollution free area, which of the following quantity remains unchanged
 - (1) Amplitude
 - (2) Velocity
 - (3) Frequency
 - (4) Wavelength
9. If v_1 , v_2 and v_3 are the speed of sound in sea water, Air and steel respectively then,
 - (1) $v_1 = v_2 = v_3$
 - (2) $v_1 > v_2 > v_3$
 - (3) $v_3 > v_2 > v_1$
 - (4) $v_3 > v_1 > v_2$
10. In case of mechanical waves which one is incorrect.
 - (1) They are longitudinal waves
 - (2) They are transverse waves
 - (3) They required medium for propagation
 - (4) They are electromagnetic waves
11. When sound is incident on surface of a medium it bounces back in same medium. Phenomenon is called as.
 - (1) refraction of sound
 - (2) deflection of sound
 - (3) defraction of sound
 - (4) reflection of sound
12. Total distance covered by sound from point of generation to reflecting surface and bounces back should be at least.
 - (1) 38 m
 - (2) 30 m
 - (3) 34 m
 - (4) 36 m
13. Sound waves cannot pass through a....
 - (1) solid liquid mixture
 - (2) perfect vacuum
 - (3) Ideal gas
 - (4) liquid gas mixture
14. A boy clapped his hands near a cliff and heard eco 3 sec later. If speed of sound is 346 m/s, then distance of cliff from boy is
 - (1) 345 m
 - (2) 519 cm
 - (3) 519 m
 - (4) 345 cm
15. With the rise of temperature, the speed of sound in a gas
 - (1) Remains the same
 - (2) Increases
 - (3) Decreases
 - (4) None of these
16. The frequency which is not audible to the human ear is
 - (1) 80 Hz
 - (2) 800 Hz
 - (3) 8000 Hz
 - (4) 80000 Hz
17. The technique used by bats to find their way to locate food is
 - (1) Flapping
 - (2) Echolocation
 - (3) SONAR
 - (4) RADAR
18. Which of the following is a wrong statement?
 - (1) light travels with a speed greater than that of sound
 - (2) light cannot travel through vaccum
 - (3) light is wave motion
 - (4) light travels in a straight path
19. A sound wave has a frequency of 3250 Hz. and a wavelength of 0.1 m. What is its velocity of sound ?
 - (1) 325 m/s
 - (2) 326 m/s
 - (3) 326.5 m/s
 - (4) 325.5 m/s

- 20.** Vibrations inside the ear are amplified by the three bones namely _____ in the middle ear.
(1) hammer, anvil and pinna
(2) hammer, cochlea and stirrup
(3) auditory bone, anvil and stirrup
(4) hammer, anvil and stirrup
- 21.** Lata and geeta were playing on identical guitars whose string were adjusted to give notes of the same pitch so what about quality of two notes in given case ?
(1) quality of two notes will be same
(2) quality of two notes will be different
(3) quality depends on pitch
(4) quality of two notes pitch depends on the waveform of the sound
- 22.** In given source, speed of wave is constant, then how frequency changes if the wavelength of the wave increased ?
(1) Increases
(2) Remains constant
(3) Decreases
(4) First increases then decreases
- 23.** If a doctor counts 75 heart beats in 1 minute, then frequency of heartbeats should be
(1) 1.255 sec (2) 1.256 sec
(3) 1.333 sec (4) 1.25 sec
- 24.** Sounds which has not melodious and grating effect on our ears is called as
(1) frequency (2) amplitude
(3) noise (4) musical sounds
- 25.** The presistance of audible sound due to the successive reflections from the surrounding objects even after the source has stopped to produce that sound is called as
(1) Echo (2) Reflection
(3) Rarefaction (4) Reverberation
- 26.** Wavelength of ultrasonic wave is
(1) very small (2) infinite
(3) zero (4) very large
- 27.** Strilling sound has maximum
(1) wavelength (2) frequency
(3) amplitude (4) wave velocity
- 28.** Which of the following is correct in case of transverse wave formation.
(1) solid and surface of liquids only
(2) only in surface
(3) only in solids
(4) solids, liquid and gases
- 29.** If a stretched strings oscillates up and down 6 times each second and the distance of one complete oscillation is 4m, what is its frequency.
(1) 6 Hz (2) 6 KHz
(3) 3 Hz (4) 1.5 Hz
- 30.** A girl on the beach watching water waves sees 4 waves pass by in 2 seconds, each with a wavelength of 0.5 m. The speed of waves in
(1) 0.5 m/s (2) 1.0 m/s
(3) 1.01 m/s (4) 0.2 m/s
- 31.** A train horn emits a constant frequency as it accelerates away from a stationary listener. Which of the following quantities actually changes for the listener ?
(1) Pitch of sound
(2) frequency and amplitude of the sound
(3) loudness of the sound
(4) a & c
- 32.** SONAR ranging is also used to see objet's
(1) shape
(2) size
(3) both size and shape
(4) none of the above
- 33.** Echo of sound is more effective if surface is
(1) porous (2) soft
(3) rigid (4) smooth
- 34.** A marine survey ship sends a sound wave to seabed which receives an echo after 2.5 sec. Speed of sound in seawater is 1200 m/s. Find the depth of sea ?
(1) 1000 m (2) 750 m
(3) 1200 m (4) 1500 m
- 35.** Characteristic of sound by which we distinguish between two sounds of same loudness and pitch is
(1) pitch (2) loudness
(3) frequency (4) quality
- 36.** Loudest animal sound ever recorded is of
(1) elephant (2) blue whale
(3) shark (4) seal
- 37.** Of the following properties of a wave, the one that is independent of the others is its
(1) velocity (2) amplitude
(3) frequency (4) wavelength
- 38.** A boat at anchor is rocked by waves of velocity 25 m/s having crests 200 m apart. They reach the boat once every
(1) 4.0 sec (2) 8.0 sec
(3) 2.0 sec (4) 0.8 sec
- 39.** The velocity of sound in space is
(1) 330 m/s (2) 344 m/s
(3) 332 m/s (4) zero m/s
- 40.** Buzzing of a mosquito is :
(1) Shrill sound (2) Loud sound
(3) Flat sound (4) Sweet sound

ANSWER KEY

Q.	1	2	3	4	5	6	7	8	9	10
A.	2	1	1	4	3	2	2	3	4	4
Q.	11	12	13	14	15	16	17	18	19	20
A.	4	3	2	3	2	4	2	2	1	4
Q.	21	22	23	24	25	26	27	28	29	30
A.	4	3	4	3	4	1	2	1	1	2
Q.	31	32	33	34	35	36	37	38	39	40
A.	4	3	3	4	4	2	2	2	4	1